TEST REPORT

CERTIFICATE OF CONFORMITY

Standard:	**47 CFR FCC Part 15, Subpart C (Section 15.249)**
Report No.:	RFBCTR-WTW-P24080500
FCC ID:	JVPCR23C
Product:	ScreenBar Halo 2
Brand:	BenQ
Model No.:	CR23_C
Received Date:	2024/9/3
Test Date:	2024/9/10 ~ 2024/9/19
Issued Date:	2024/12/10
Applicant:	BenQ CORPORATION
Address:	No. 16, Jihu Rd., Neihu Dist., Taipei City 114066, Taiwan (R.O.C.)
Issued By:	Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch Hsin Chu Laboratory
Lab Address:	E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300, Taiwan
Test Location:	E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300, Taiwan
FCC Registration / Designation Number:	723255 / TW2022

Approved by: Wen Yu , **Date:** 2024/12/10

Wen Yu / Assistant Manager

This test report consists of 32 pages in total. It may be duplicated completely for legal use with the approval of the applicant. It should not be reproduced except in full, without the written approval of our laboratory. The test results in the report only apply to the tested sample. The test results in this report are traceable to the national or international standards.

Prepared by : Claire Kuan / Specialist

Table of Contents

Release Control Record

Issue No.	Description	Date Issued
RFBCTR-WTW-P24080500	Original release.	2024/12/10

1 Certificate

Product:	ScreenBar Halo 2
Brand:	BenQ
Test Model:	CR23_C
Sample Status:	Engineering sample
Applicant:	BenQ CORPORATION
Test Date:	2024/9/10 ~ 2024/9/19
Standard:	47 CFR FCC Part 15, Subpart C (Section 15.249)
Measurement procedure:	ANSI C63.10-2013

The above equipment has been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's RF characteristics under the conditions specified in this report.

2 Summary of Test Results

47 CFR FCC Part 15, Subpart C (Section 15.249)			
Standard / Clause	Test Item	Result	Remark
15.207	AC Power Conducted Emissions	Pass	Minimum passing margin is -2.50 dB at 25.26563 MHz
15.209 / 15.249(d)	Radiated Emissions below 1 GHz	Pass	Minimum passing margin is -15.6 dB at 731.14 MHz
15.209 / 15.249(a) / 15.249(d) / 15.249(e)	Radiated Emissions above 1 GHz	Pass	Minimum passing margin is -7.4 dB at 2400.00 MHz
15.215 (c)	20 dB Bandwidth	Pass	Meet the requirement of limit.
15.203	Antenna Requirement	Pass	No antenna connector is used.

Note: Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.

2.1 Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

Measurement	Specification	Expanded Uncertainty (k=2) (±)
AC Power Conducted Emissions	150 kHz ~ 30 MHz	1.9 dB
Radiated Emissions below 1 GHz	9 kHz ~ 30 MHz	3.1 dB
	30 MHz ~ 1 GHz	5.1 dB
Unwanted Emissions above 1 GHz	1 GHz ~ 18 GHz	5.1 dB
	18 GHz ~ 40 GHz	5.3 dB
20 dB Bandwidth	-	1050.00 Hz

The other instruments specified are routine verified to remain within the calibrated levels, no measurement uncertainty is required to be calculated.

2.2 Supplementary Information

There is not any deviation from the test standards for the test method, and no modifications required for compliance.

3 General Information

3.1 General Description

Product	ScreenBar Halo 2
Brand	BenQ
Test Model	CR23_C
Status of EUT	Engineering sample
Power Supply Rating	5 Vdc from USB interface
Modulation Type	GFSK
Modulation Technology	DTS
Transfer Rate	125 kbps
Operating Frequency	2.405 GHz ~ 2.475 GHz
Number of Channel	3
Field Strength Of Fundamental	85.5 dBuV/m (Average) at 3 meters

Note:

1. The EUT uses following accessories.

Item	Brand	Model	Specification
AC Adapter	BenQ	PS15J050K3000UC	AC Input: 100-240 Vac, 50/60 Wh, 0.5 A Max DC Output: 5 Vdc, 3.0 A, 15 W

2. Qisda Ref. no: AL-31796.
3. The above EUT information is declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications or User's Manual.

3.2 Antenna Description of EUT

1. The antenna information is listed as below.

Antenna Net Gain (dBi)	Frequency Range (GHz)	Antenna Type	Connector Type
-4.09	2.4~2.4835	PIFA	None

* Due to radiated measurements are made and the antenna gain is already accounted for this device, so provide an antenna datasheet and/or antenna measurement report is not required. The antenna dimensions and pictures (include antenna wire length if have) are stated in EUT photo exhibit.

3.3 Channel List

3 channels are provided to this EUT:

Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	2405	2	2446
3	2475		

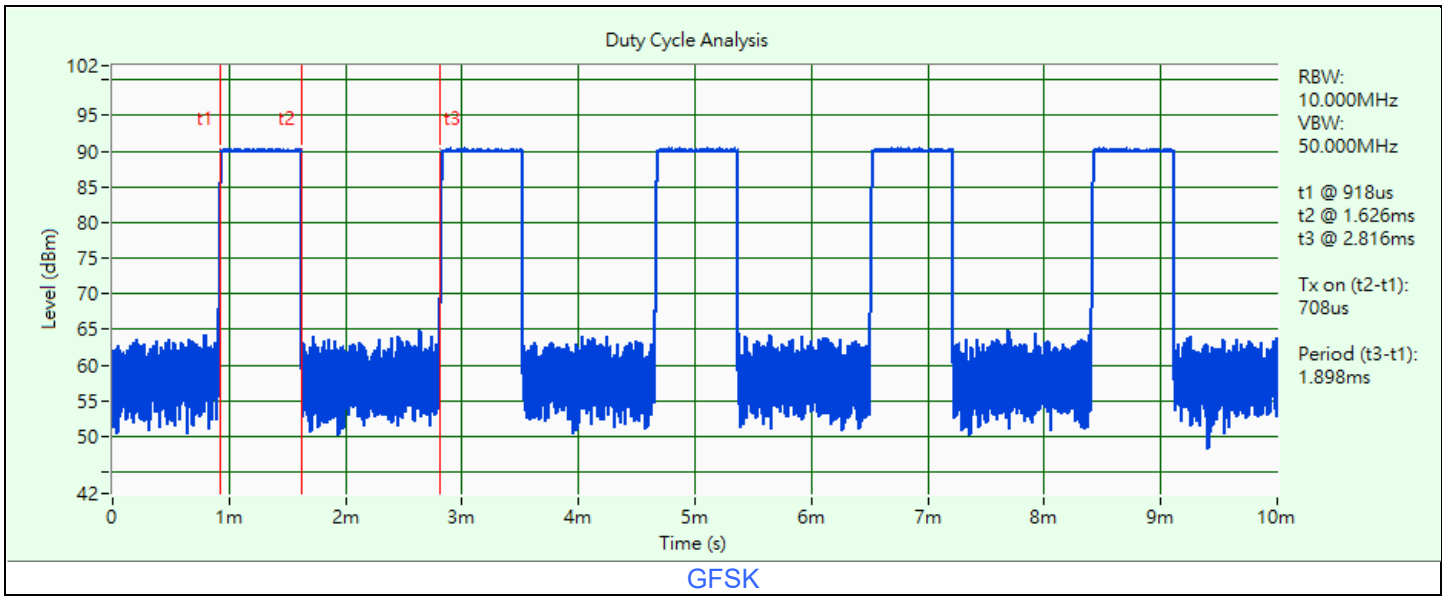
3.4 Test Mode Applicability and Tested Channel Detail

Following channel(s) was (were) selected for the final test as listed below:

Test Item	Tested Channel	Modulation	Data Rate Parameter
AC Power Conducted Emissions	3	GFSK	125kbps
Radiated Emissions below 1 GHz	3	GFSK	125kbps
Radiated Emissions above 1 GHz	1, 2, 3	GFSK	125kbps
20 dB Bandwidth	1, 2, 3	GFSK	125kbps

3.5 Duty Cycle of Test Signal

GFSK: Duty cycle = 0.708 ms / 1.898 ms x 100% = 37.3%

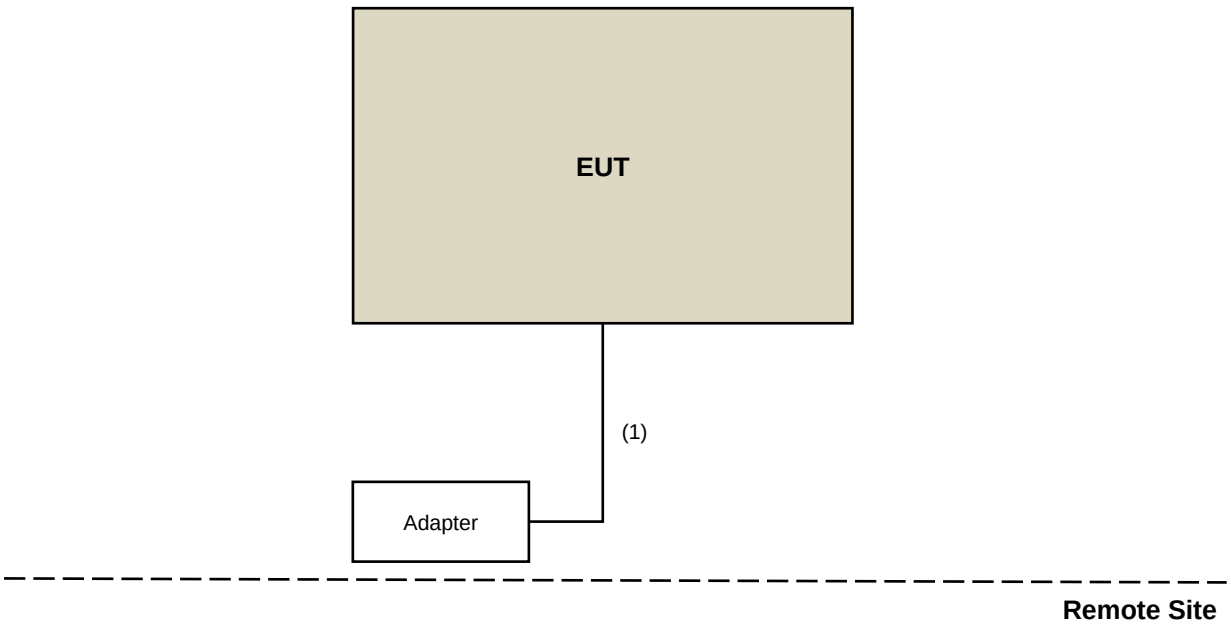


GFSK

3.6 Test Program Used and Operation Descriptions

Controlling software (Press Button) has been activated to set the EUT under transmission condition continuously at specific channel frequency.

3.7 Connection Diagram of EUT and Peripheral Devices



3.8 Configuration of Peripheral Devices and Cable Connections

ID	Cable Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1	Type C Cable	1	1.5	No	0	Supplied by applicant

4 Test Instruments

The calibration interval of the all test instruments are 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

4.1 AC Power Conducted Emissions

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
50 ohm terminal resistance Telegartner	50 ohm	3	2023/10/20	2024/10/19
EMI Test Receiver R&S	ESCS 30	100375	2024/5/20	2025/5/19
Fixed Attenuator STI	STI02-2200-10	005	2024/2/19	2025/2/18
LISN R&S	ESH3-Z5	835239/001	2024/4/3	2025/4/2
		848773/004	2023/10/13	2024/10/12
RF Coaxial Cable JYEBAO	5D-FB	COCCAB-001	2024/2/19	2025/2/18
Software BVADT	BVADT_Cond_V7.3.7.4	N/A	N/A	N/A

Notes:

1. The test was performed in Conduction 1
2. Tested Date: 2024/9/12

4.2 Radiated Emissions below 1 GHz

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
Bi_Log Antenna Schwarzbeck	VULB 9168	9168-0842	2023/10/12	2024/10/11
Boresight Antenna Tower & Turn Table Max-Full	MF-7802BS	MF780208530	N/A	N/A
EMI Test Receiver R&S	ESR7	102026	2024/3/25	2025/3/24
Fixed Attenuator Mini-Circuits	UNAT-5+	PAD-ATT5-02	2024/3/30	2025/3/29
Loop Antenna TESEQ	HLA 6121	63620	2023/10/13	2024/10/12
Preamplifier EMCI	EMC330N	980538	2024/3/30	2025/3/29
	EMC001340	980142	2024/2/19	2025/2/18
PXA Signal Analyzer Keysight	N9030B	MY57141948	2024/5/20	2025/5/19
RF Coaxial Cable JYEBAO	5D-FB	LOOPCAB-001	2024/2/19	2025/2/18
		LOOPCAB-002	2024/2/19	2025/2/18
RF Coaxial Cable PEWC	8D	966-5-1	2024/3/30	2025/3/29
		966-5-2	2024/3/30	2025/3/29
		966-5-3	2024/3/30	2025/3/29
Software	ADT_Radiated_V8.7.08	N/A	N/A	N/A

Notes:

1. The test was performed in 966 Chamber No. 5.
2. Tested Date: 2024/9/11

4.3 Radiated Emissions above 1 GHz

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
Boresight Antenna Tower & Turn Table Max-Full	MF-7802BS	MF780208530	N/A	N/A
EMI Test Receiver R&S	ESR7	102026	2024/3/25	2025/3/24
Horn Antenna Schwarzbeck	BBHA 9120D	9120D-1819	2023/11/12	2024/11/11
	BBHA 9170	9170-739	2023/11/12	2024/11/11
Preamplifier EMCI	EMC12630SE	980509	2024/1/29	2025/1/28
	EMC184045SE	980387	2024/8/8	2025/8/7
PXA Signal Analyzer Keysight	N9030B	MY57141948	2024/5/20	2025/5/19
RF Coaxial Cable EMCI	EMC102-KM-KM-1200	160924	2024/1/29	2025/1/28
	EMC102-KM-KM-4000	200214	2024/1/29	2025/1/28
	EMC104-SM-SM-1500	180503	2024/3/16	2025/3/15
	EMC104-SM-SM-2000	180501	2024/3/16	2025/3/15
	EMC104-SM-SM-6000	180506	2024/3/16	2025/3/15
Software	ADT_Radiated_V8.7.08	N/A	N/A	N/A

Notes:

1. The test was performed in 966 Chamber No. 5.
2. Tested Date: 2024/9/10 ~ 2024/9/12

4.4 20 dB Bandwidth

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
MXA Signal Analyzer Keysight	N9020B	MY60112408	2024/3/7	2025/3/6
Software	ADT_RF Test Software V7.6.5.4	N/A	N/A	N/A

Notes:

1. The test was performed in Oven room 2.
2. Tested Date: 2024/9/19

5 Limits of Test Items

5.1 AC Power Conducted Emissions

Frequency (MHz)	Conducted Limit (dBuV)	
	Quasi-peak	Average
0.15 - 0.5	66 - 56	56 - 46
0.50 - 5.0	56	46
5.0 - 30.0	60	50

Notes:

1. The lower limit shall apply at the transition frequencies.
2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50 MHz.

5.2 Radiated Emissions below 1 GHz

Radiated emissions which fall in the restricted bands must comply with the radiated emission limits specified as below table.

Frequencies (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009 ~ 0.490	2400/F(kHz)	300
0.490 ~ 1.705	24000/F(kHz)	30
1.705 ~ 30.0	30	30
30 ~ 88	100	3
88 ~ 216	150	3
216 ~ 960	200	3
Above 960	500	3

Notes:

1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBuV/m) = 20 log Emission level (uV/m).

5.3 Radiated Emissions above 1 GHz

The field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following.

Fundamental Frequency	Field Strength of Fundamental (millivolts/meter)	Field Strength of Harmonics (microvolts/meter)
2400 ~ 2483.5 MHz	50	500

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits as below table, whichever is the lesser attenuation.

Frequencies (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
Above 960	500	3

Notes:

1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBuV/m) = 20 log Emission level (uV/m).
3. For frequencies above 1000 MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20 dB under any condition of modulation.

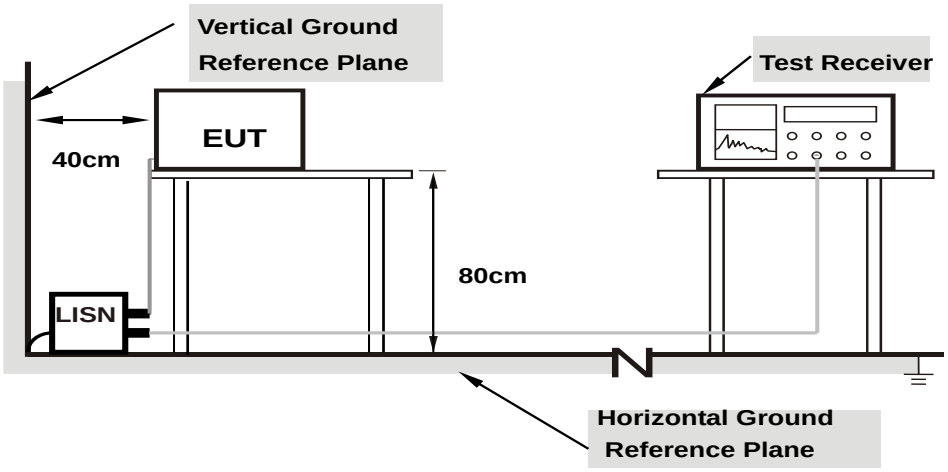
5.4 20 dB Bandwidth

The 20dB bandwidth shall be specified in operating frequency band.

6 Test Arrangements

6.1 AC Power Conducted Emissions

6.1.1 Test Setup



Note: 1.Support units were connected to second LISN.

For the actual test configuration, please refer to the attached file (Test Setup Photo).

6.1.2 Test Procedure

a. The EUT was placed on a 0.8 meter to the top of table and placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50 uH of coupling impedance for the measuring instrument.

b. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.

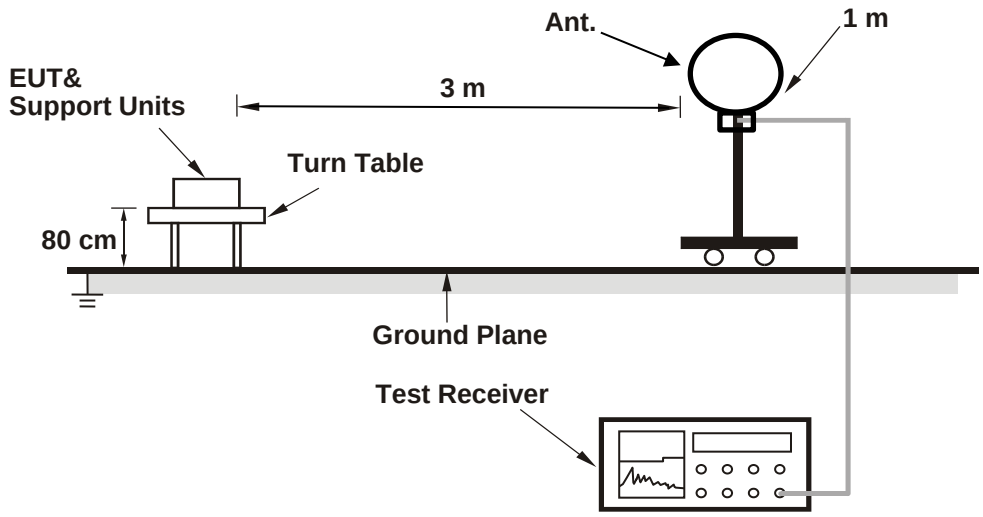
c. The frequency range from 150 kHz to 30 MHz was searched. Emission levels under (Limit – 20 dB) was not recorded.

Note: The resolution bandwidth and video bandwidth of test receiver is 9 kHz for quasi-peak detection (QP) and average detection (AV) at frequency 0.15 MHz-30 MHz.

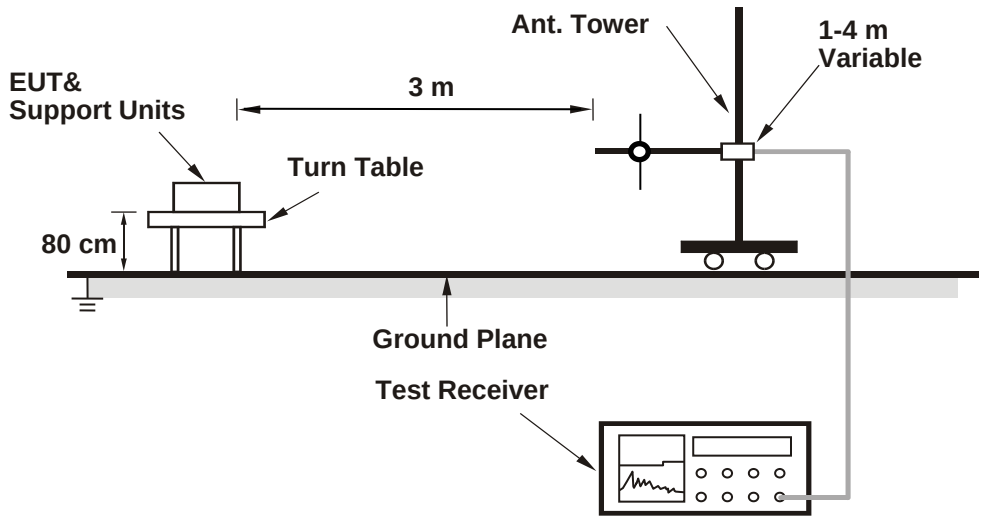
6.2 Radiated Emissions below 1 GHz

6.2.1 Test Setup

For Radiated emission below 30 MHz



For Radiated emission above 30 MHz



For the actual test configuration, please refer to the attached file (Test Setup Photo).

6.2.2 Test Procedure

For Radiated emission below 30 MHz

a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.

b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

c. Parallel, perpendicular, and ground-parallel orientations of the antenna are set to make the measurement.

d. For each suspected emission, the EUT was arranged to its worst case and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.

e. The test-receiver system was set to Quasi-Peak Detect Function and Specified Bandwidth with Maximum Hold Mode, except for the frequency band (9 kHz to 90 kHz and 110 kHz to 490 kHz) set to average detect function and peak detect function.

Notes:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 200 Hz at frequency below 150 kHz.
2. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 9 kHz or 10 kHz at frequency (150 kHz to 30 MHz).
3. All modes of operation were investigated and the worst-case emissions are reported.

For Radiated emission above 30 MHz

a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.

b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

c. The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.

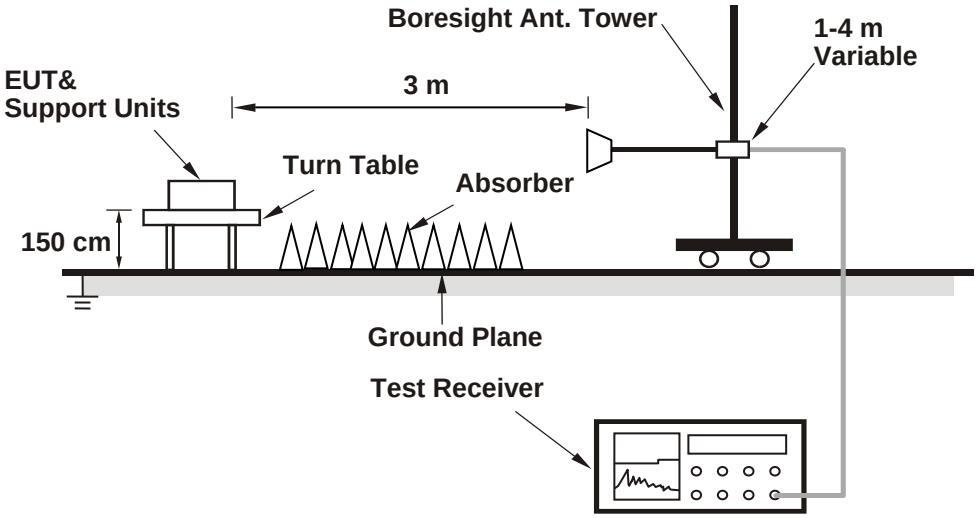
e. The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.

Notes:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 kHz for Quasi-peak detection (QP) at frequency below 1 GHz.
2. All modes of operation were investigated and the worst-case emissions are reported.

6.3 Radiated Emissions above 1 GHz

6.3.1 Test Setup



For the actual test configuration, please refer to the attached file (Test Setup Photo).

6.3.2 Test Procedure

a. The EUT was placed on the top of a rotating table 1.5 meters above the ground at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.

b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

c. The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.

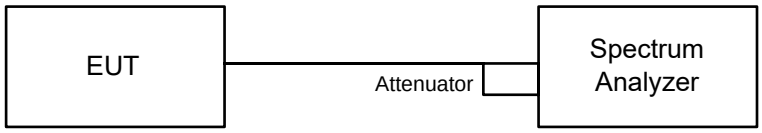
e. The test-receiver system was set to peak and average detects function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz. If the peak reading value also meets average limit, measurement with the average detector is unnecessary.

Notes:

1. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) and Average detection (AV) at frequency above 1 GHz.
2. According to ANSI C63.10 section 6.6.4 and 4.1.4.2.2. For fundamental and harmonic signal measurement, according to ANSI C63.10 section 7.5, the average value = peak value + duty cycle correction factor. For duty cycle correction factor values, see the Test Signal Duty Cycle section in this report.
3. All modes of operation were investigated and the worst-case emissions are reported.

6.4 20 dB Bandwidth

6.4.1 Test Setup



6.4.2 Test Procedure

1) Set resolution bandwidth (RBW) = 1% to 5% of the OBW
2) Set the video bandwidth (VBW) ≥ 3 x RBW, Detector = Peak.
3) Trace mode = max hold.
4) Sweep = auto couple.
5) Measure the maximum width of the emission that is constrained by the frequencies associated with the two amplitude points (upper and lower) that are attenuated by 20 dB relative to the maximum level measured in the fundamental emission

7 Test Results of Test Item

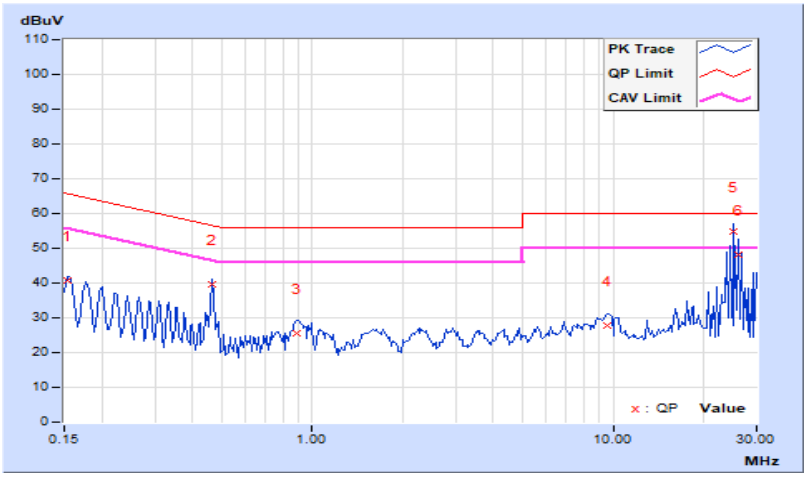
7.1 AC Power Conducted Emissions

RF Mode	GFSK	**Channel**	CH 3：2475 MHz
Frequency Range	150 kHz ~ 30 MHz	**Detector Function & Resolution Bandwidth**	Quasi-Peak (QP) / Average (AV), 9 kHz
Input Power	120 Vac, 60 Hz	**Environmental Conditions**	24 °C, 64 % RH
Tested By	Willy Lin		

Phase Of Power : Line (L)										
No	**Frequency (MHz)**	**Correction Factor (dB)**	**Reading Value (dBuV)**		**Emission Level (dBuV)**		**Limit (dBuV)**		**Margin (dB)**	
			Q.P.	**AV.**	**Q.P.**	**AV.**	**Q.P.**	**AV.**	**Q.P.**	**AV.**
1	0.15391	9.94	30.78	16.74	40.72	26.68	65.79	55.79	-25.07	-29.11
2	0.46641	9.95	29.83	28.16	39.78	38.11	56.58	46.58	-16.80	-8.47
3	0.88438	9.98	15.76	13.16	25.74	23.14	56.00	46.00	-30.26	-22.86
4	9.56250	10.62	17.09	7.67	27.71	18.29	60.00	50.00	-32.29	-31.71
5	**25.26563**	**11.51**	**43.18**	**35.99**	**54.69**	**47.50**	**60.00**	**50.00**	**-5.31**	**-2.50**
6	26.01953	11.53	36.75	27.26	48.28	38.79	60.00	50.00	-11.72	-11.21

Remarks:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level – Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value

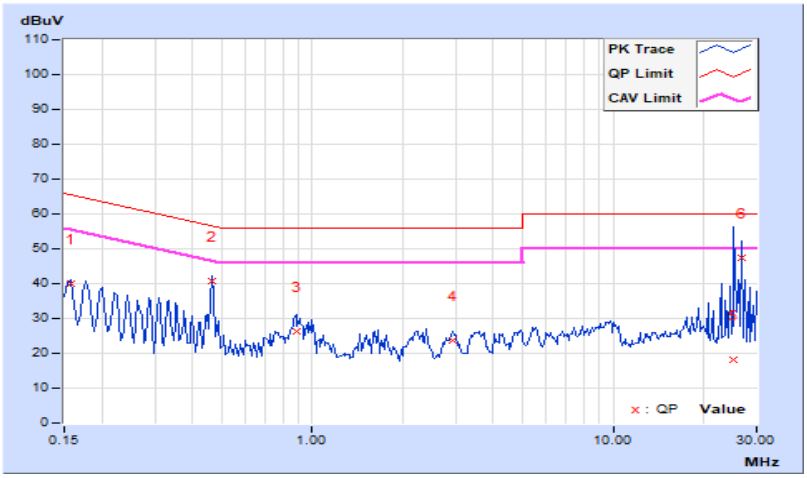


RF Mode	GFSK	**Channel**	CH 3：2475 MHz
Frequency Range	150 kHz ~ 30 MHz	**Detector Function & Resolution Bandwidth**	Quasi-Peak (QP) / Average (AV), 9 kHz
Input Power	120 Vac, 60 Hz	**Environmental Conditions**	24 °C, 64 % RH
Tested By	Willy Lin		

Phase Of Power : Neutral (N)										
No	**Frequency (MHz)**	**Correction Factor (dB)**	**Reading Value (dBuV)**		**Emission Level (dBuV)**		**Limit (dBuV)**		**Margin (dB)**	
			Q.P.	**AV.**	**Q.P.**	**AV.**	**Q.P.**	**AV.**	**Q.P.**	**AV.**
1	0.15781	10.01	30.03	14.65	40.04	24.66	65.58	55.58	-25.54	-30.92
2	0.46641	10.02	30.66	23.62	40.68	33.64	56.58	46.58	-15.90	-12.94
3	0.88438	10.04	16.21	10.73	26.25	20.77	56.00	46.00	-29.75	-25.23
4	2.92188	10.14	13.51	7.84	23.65	17.98	56.00	46.00	-32.35	-28.02
5	24.98438	11.14	6.94	-4.87	18.08	6.27	60.00	50.00	-41.92	-43.73
6	26.78125	11.16	36.25	16.53	47.41	27.69	60.00	50.00	-12.59	-22.31

Remarks:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level – Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value



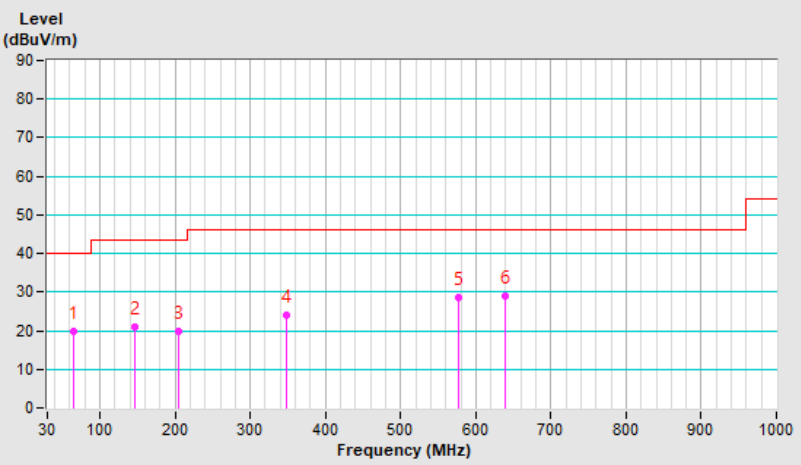
7.2 Radiated Emissions below 1 GHz

RF Mode	GFSK	**Channel**	CH 3：2475 MHz
Frequency Range	30 MHz ~ 1 GHz	**Detector Function & Bandwidth**	QP: RB=120kHz, DET=Quasi-Peak
Input Power	120 Vac, 60 Hz	**Environmental Conditions**	21 °C, 61 % RH
Tested By	Willy Lin		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	**Frequency (MHz)**	**Emission Level (dBuV/m)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Height (m)**	**Table Angle (Degree)**	**Raw Value (dBuV)**	**Correction Factor (dB/m)**
1	65.50	19.6 QP	40.0	-20.4	1.00 H	217	33.5	-13.9
2	145.48	21.1 QP	43.5	-22.4	2.00 H	97	33.5	-12.4
3	205.11	19.9 QP	43.5	-23.6	2.00 H	115	35.9	-16.0
4	348.48	24.1 QP	46.0	-21.9	3.00 H	63	34.8	-10.7
5	577.23	28.7 QP	46.0	-17.3	3.00 H	333	34.1	-5.4
6	639.23	28.9 QP	46.0	-17.1	3.00 H	41	32.6	-3.7

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit of frequency range 30 MHz ~ 1 GHz.
5. The frequency range 9 kHz ~ 30 MHz: all emissions are more than 20 dB below the limit, therefore do not be recorded in this report.

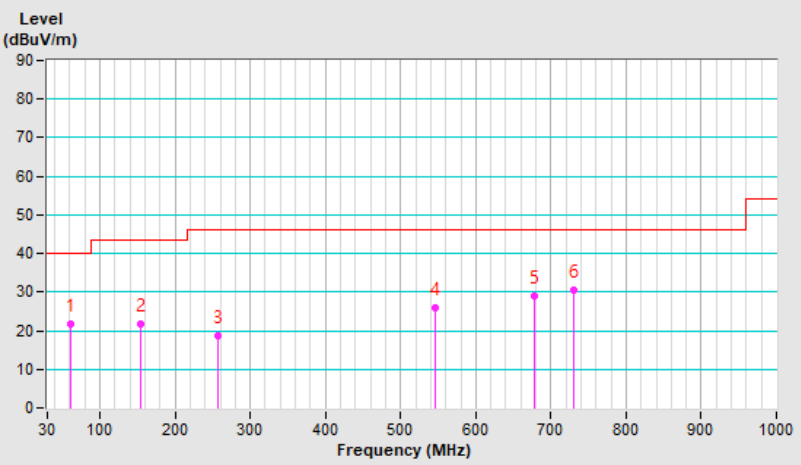


RF Mode	GFSK	Channel	CH 3：2475 MHz
Frequency Range	30 MHz ~ 1 GHz	Detector Function & Bandwidth	QP: RB=120kHz, DET=Quasi-Peak
Input Power	120 Vac, 60 Hz	Environmental Conditions	21 °C, 61 % RH
Tested By	Willy Lin		

Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	61.62	21.7 QP	40.0	-18.3	1.00 V	303	35.1	-13.4
2	153.82	21.6 QP	43.5	-21.9	4.00 V	41	33.7	-12.1
3	257.03	18.5 QP	46.0	-27.5	4.00 V	256	32.0	-13.5
4	545.51	25.8 QP	46.0	-20.2	4.00 V	45	31.8	-6.0
5	677.62	29.0 QP	46.0	-17.0	4.00 V	360	32.5	-3.5
6	**731.14**	**30.4 QP**	**46.0**	**-15.6**	**2.00 V**	**324**	**32.7**	**-2.3**

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit of frequency range 30 MHz ~ 1 GHz.
5. The frequency range 9 kHz ~ 30 MHz: all emissions are more than 20 dB below the limit, therefore do not be recorded in this report.



7.3 Radiated Emissions above 1 GHz

RF Mode	GFSK	**Channel**	CH 1：2405 MHz
Frequency Range	1 GHz ~ 25 GHz	**Detector Function & Bandwidth**	PK: RB=1 MHz, VB=3 MHz, DET=Peak AV: RB=1 MHz, VB=3 MHz, DET=RMS
Input Power (System)	120 Vac, 60 Hz	**Environmental Conditions**	22 °C, 63 % RH
Tested By	Willy Lin		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	**Frequency (MHz)**	**Emission Level (dBuV/m)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Height (m)**	**Table Angle (Degree)**	**Raw Value (dBuV)**	**Correction Factor (dB/m)**
1	2400.00	55.2 PK	74.0	-18.8	2.00 H	245	58.8	-3.6
2	**2400.00**	**46.6 AV**	**54.0**	**-7.4**	**2.00 H**	**245**	**50.2**	**-3.6**
3	*2405.00	93.6 PK	114.0	-20.4	2.00 H	245	97.2	-3.6
4	*2405.00	85.0 AV	94.0	-9.0	2.00 H	245	88.6	-3.6
5	4810.00	37.4 PK	74.0	-36.6	1.52 H	126	35.7	1.7
6	4810.00	28.8 AV	54.0	-25.2	1.52 H	126	27.1	1.7
7	7215.00	41.6 PK	74.0	-32.4	1.53 H	250	34.3	7.3
8	7215.00	33.0 AV	54.0	-21.0	1.53 H	250	25.7	7.3
Antenna Polarity & Test Distance : Vertical at 3 m								
No	**Frequency (MHz)**	**Emission Level (dBuV/m)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Height (m)**	**Table Angle (Degree)**	**Raw Value (dBuV)**	**Correction Factor (dB/m)**
1	2400.00	54.2 PK	74.0	-19.8	1.31 V	352	57.8	-3.6
2	2400.00	45.6 AV	54.0	-8.4	1.31 V	352	49.2	-3.6
3	*2405.00	90.6 PK	114.0	-23.4	1.31 V	352	94.2	-3.6
4	*2405.00	82.0 AV	94.0	-12.0	1.31 V	352	85.6	-3.6
5	4810.00	38.9 PK	74.0	-35.1	1.00 V	251	37.2	1.7
6	4810.00	30.3 AV	54.0	-23.7	1.00 V	251	28.6	1.7
7	7215.00	42.6 PK	74.0	-31.4	1.50 V	279	35.3	7.3
8	7215.00	34.0 AV	54.0	-20.0	1.50 V	279	26.7	7.3

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency.
6. The average value of fundamental and harmonic frequency is: Average = Peak value + 20 log(Duty cycle) Where the duty cycle correction factor is calculated from following formula:
   20 log(Duty cycle) = 20 log(0.708 ms / 1.898 ms) = -8.6 dB

RF Mode	GFSK	Channel	CH 2：2446 MHz
Frequency Range	1 GHz ~ 25 GHz	Detector Function & Bandwidth	PK: RB=1 MHz, VB=3 MHz, DET=Peak AV: RB=1 MHz, VB=3 MHz, DET=RMS
Input Power (System)	120 Vac, 60 Hz	Environmental Conditions	22 °C, 63 % RH
Tested By	Willy Lin		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2446.00	93.8 PK	114.0	-20.2	2.02 H	247	97.2	-3.4
2	*2446.00	85.2 AV	94.0	-8.8	2.02 H	247	88.6	-3.4
3	4892.00	37.5 PK	74.0	-36.5	1.46 H	136	36.0	1.5
4	4892.00	28.9 AV	54.0	-25.1	1.46 H	136	27.4	1.5
5	7338.00	41.5 PK	74.0	-32.5	1.55 H	242	33.7	7.8
6	7338.00	32.9 AV	54.0	-21.1	1.55 H	242	25.1	7.8
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2446.00	89.9 PK	114.0	-24.1	1.35 V	151	93.3	-3.4
2	*2446.00	81.3 AV	94.0	-12.7	1.35 V	151	84.7	-3.4
3	4892.00	38.5 PK	74.0	-35.5	1.01 V	250	37.0	1.5
4	4892.00	29.9 AV	54.0	-24.1	1.01 V	250	28.4	1.5
5	7338.00	42.1 PK	74.0	-31.9	1.44 V	278	34.3	7.8
6	7338.00	33.5 AV	54.0	-20.5	1.44 V	278	25.7	7.8

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency.
6. The average value of fundamental and harmonic frequency is: Average = Peak value + 20 log(Duty cycle) Where the duty cycle correction factor is calculated from following formula:
   20 log(Duty cycle) = 20 log(0.708 ms / 1.898 ms) = -8.6 dB

RF Mode	GFSK	Channel	CH 3：2475 MHz
Frequency Range	1 GHz ~ 25 GHz	Detector Function & Bandwidth	PK: RB=1 MHz, VB=3 MHz, DET=Peak AV: RB=1 MHz, VB=3 MHz, DET=RMS
Input Power (System)	120 Vac, 60 Hz	Environmental Conditions	22 °C, 63 % RH
Tested By	Willy Lin		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2475.00	94.1 PK	114.0	-19.9	2.01 H	246	97.5	-3.4
2	*2475.00	85.5 AV	94.0	-8.5	2.01 H	246	88.9	-3.4
3	2483.50	54.1 PK	74.0	-19.9	2.01 H	246	57.5	-3.4
4	2483.50	45.5 AV	54.0	-8.5	2.01 H	246	48.9	-3.4
5	4950.00	37.6 PK	74.0	-36.4	1.51 H	125	36.0	1.6
6	4950.00	29.0 AV	54.0	-25.0	1.51 H	125	27.4	1.6
7	7425.00	42.5 PK	74.0	-31.5	1.50 H	216	34.8	7.7
8	7425.00	33.9 AV	54.0	-20.1	1.50 H	216	26.2	7.7
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2475.00	89.6 PK	114.0	-24.4	1.38 V	126	93.0	-3.4
2	*2475.00	81.0 AV	94.0	-13.0	1.38 V	126	84.4	-3.4
3	2483.50	53.6 PK	74.0	-20.4	1.38 V	126	57.0	-3.4
4	2483.50	45.0 AV	54.0	-9.0	1.38 V	126	48.4	-3.4
5	4950.00	38.1 PK	74.0	-35.9	1.12 V	249	36.5	1.6
6	4950.00	29.5 AV	54.0	-24.5	1.12 V	249	27.9	1.6
7	7425.00	42.9 PK	74.0	-31.1	1.56 V	271	35.2	7.7
8	7425.00	34.3 AV	54.0	-19.7	1.56 V	271	26.6	7.7

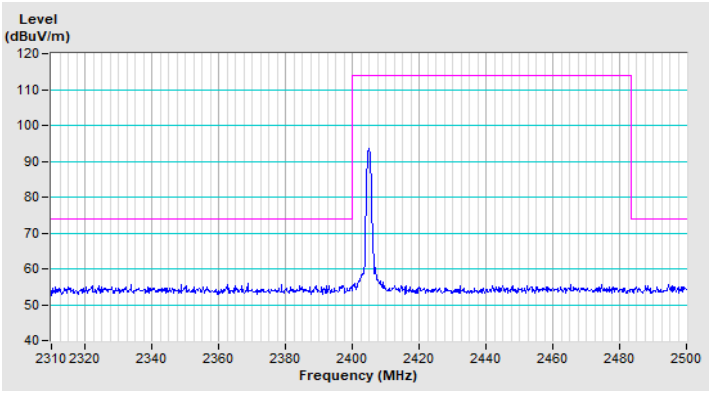
Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency.
6. The average value of fundamental and harmonic frequency is: Average = Peak value + 20 log(Duty cycle) Where the duty cycle correction factor is calculated from following formula:
   20 log(Duty cycle) = 20 log(0.708 ms / 1.898 ms) = -8.6 dB

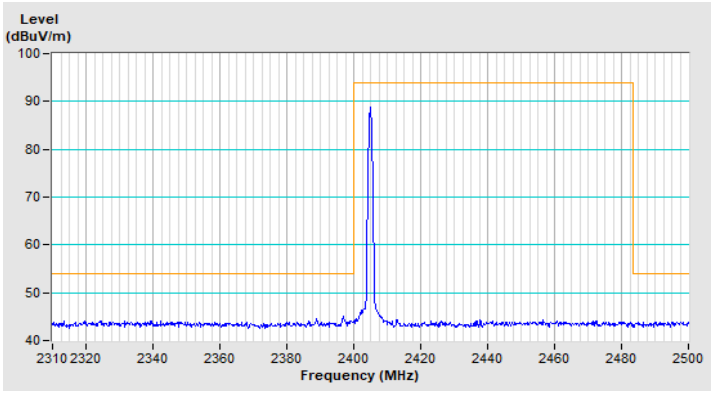
Plot of Band Edge

Frequency Range	2.31 GHz ~ 2.5 GHz	Detector Function & Bandwidth	PK: RB=1 MHz, VB=3 MHz, DET=Peak AV: RB=1 MHz, VB=3 MHz, DET=RMS

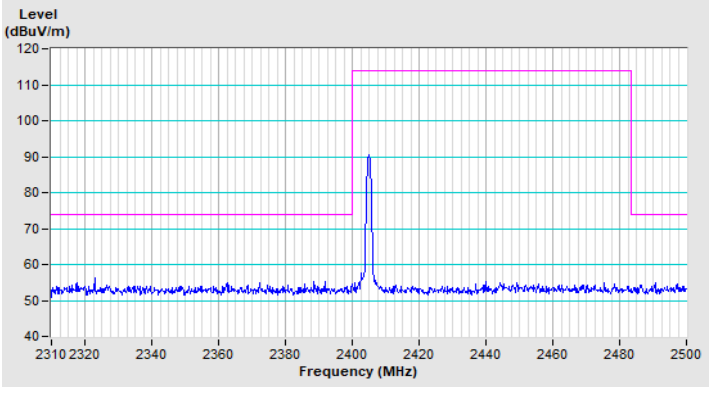
GFSK Channel 1



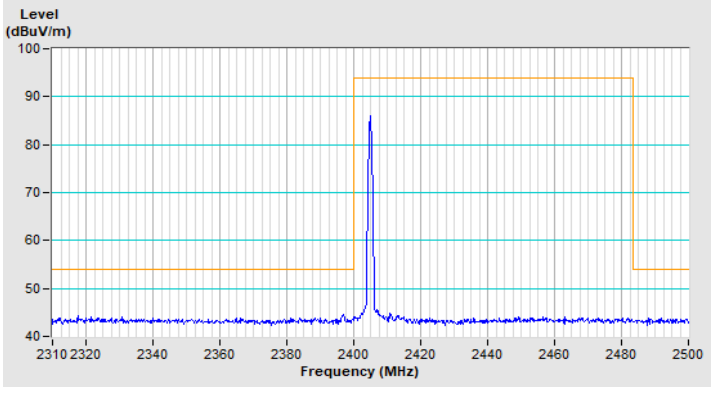
Horizontal (Peak)



Horizontal (Average)

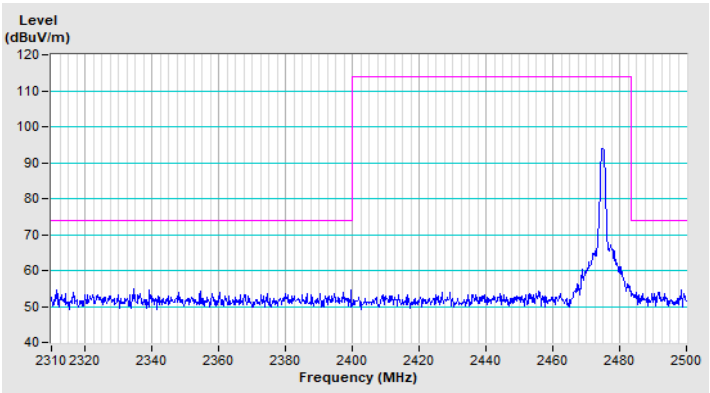


Vertical (Peak)

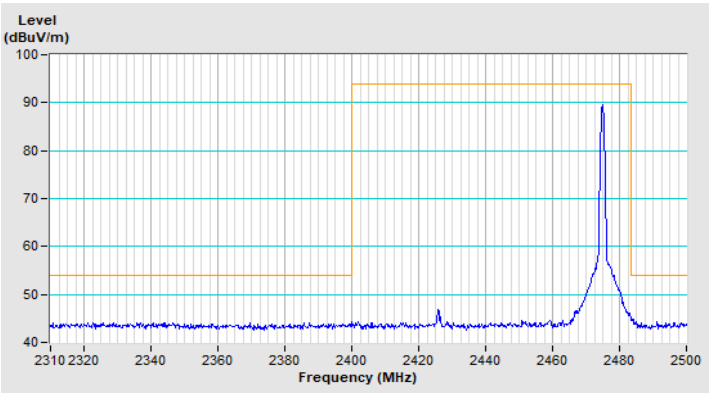


Vertical (Average)

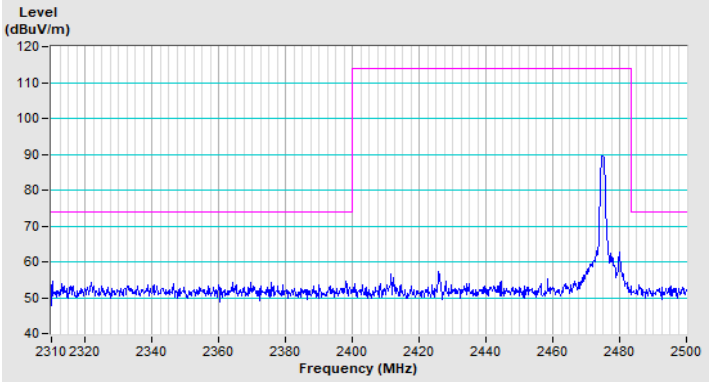
GFSK Channel 3



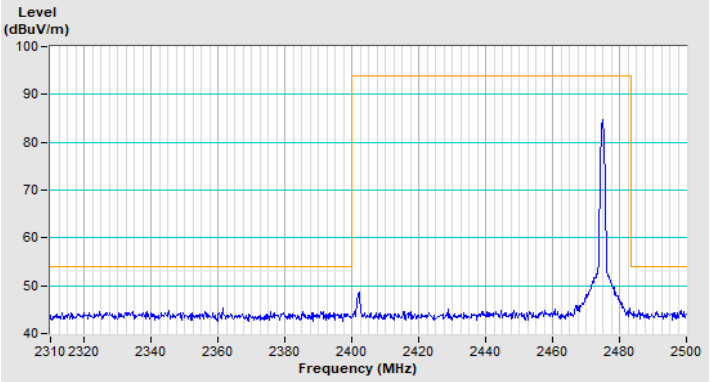
Horizontal (Peak)



Horizontal (Average)



Vertical (Peak)



Vertical (Average)

7.4 20 dB Bandwidth

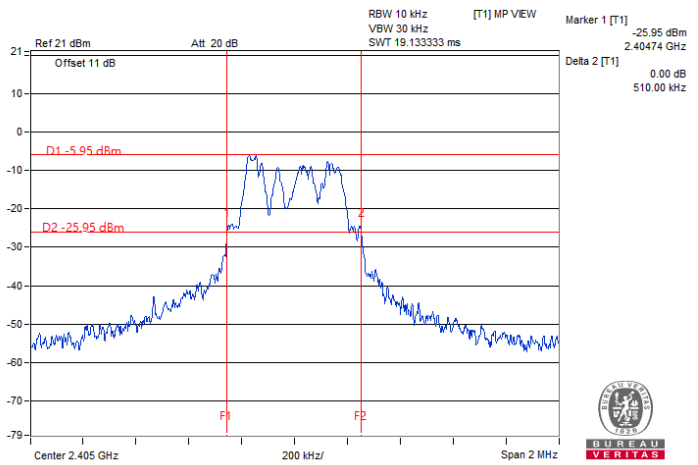
Input Power:	120 Vac, 60 Hz	Environmental Conditions:	25°C, 60% RH	Tested By:	Willy Lin

Channel	Channel Frequency (MHz)	20 dB Bandwidth (MHz)	Measured Frequencies		Operating Frequency Band (MHz)	Test Result
			FL (MHz)	FH (MHz)		
1	2405	0.51	2404.74	2405.25	2400 ~ 2483.5	Pass
2	2446	0.51	2445.74	2446.25		Pass
3	2475	0.51	2474.74	2475.25		Pass

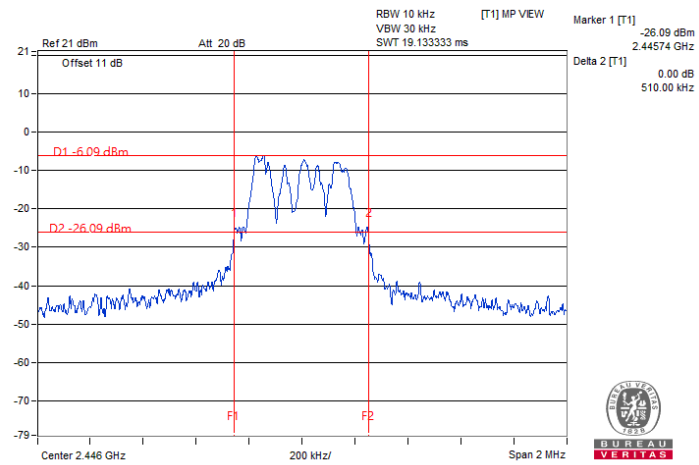
Notes:

1. FL is the lowest frequency of the 20 dB bandwidth of power envelope.
2. FH is the highest frequency of the 20 dB bandwidth of power envelope.

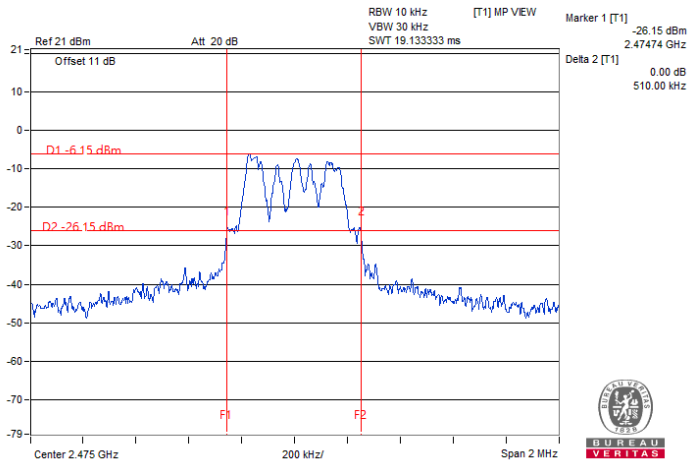
Spectrum Plot



CH 1



CH 2



CH 3

8 Pictures of Test Arrangements

Please refer to the attached file (Test Setup Photo)

9 Information of the Testing Laboratories

We, Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch, were founded in 1988 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are FCC recognized accredited test firms and accredited according to ISO/IEC 17025.

If you have any comments, please feel free to contact us at the following:

Lin Kou EMC/RF Lab
Tel: 886-2-26052180
Fax: 886-2-26051924

Hsin Chu EMC/RF/Telecom Lab
Tel: 886-3-6668565
Fax: 886-3-6668323

Hwa Ya EMC/RF/Safety Lab
Tel: 886-3-3183232
Fax: 886-3-3270892

Email: service.adt@bureauveritas.com
Web Site: http://ee.bureauveritas.com.tw

The address and road map of all our labs can be found in our web site also.

--- END ---